

REMARKS

Claims 3, 4, 6-41 and 68-72 are pending herein. Claims 14-41 have been allowed. Claims 1, 2, 5 and 42-67 have been cancelled without prejudice or disclaimer. The subject matter of cancelled claim 1 has been incorporated into claim 8. Claim 10 has been amended as supported by Figs. 7 and 28 of the present application. Claims 3, 4, 6-10, 14-19, 22, 24, 26, 28-38, 40 and 41 have been amended to correct minor informalities. Attached hereto as pages 14-20, pursuant to Rule 1.121(c)(1)(ii), is a marked-up version of the amended claims.

New claims 68-72 have been added to correspond to claims 3, 4, 6, 7 and 9, respectively, and depend from claim 10.

1. Applicants affirm the provisional election to prosecute claims 1-41. Claims 42-67 have been withdrawn from consideration as being drawn to a non-elected invention, and thus have been cancelled without prejudice or disclaimer. Applicants reserve the right under 35 USC §121 to file a divisional application for the non-elected claims.

2. Claim 7 was rejected under §112, second paragraph, for the reasons stated on page 2 of the Office Action. Claim 7 recites that an underlying layer is formed on a surface of the piezoelectric/electrostrictive element opposed to a thin plate section. Fig. 1 of the present application shows that P/E elements 24a and 24b each have surface portions facing away from and facing toward thin plate sections 16a and 16b. As such, the claimed underlying layer is positioned on a surface of the P/E elements which is opposed to (i.e., facing) the thin plate sections. Reconsideration and withdrawal of this rejection are respectfully requested.

3. Claims 1-5, 7 and 9 were rejected under §102(a) over Ogawa, Kolm, Riedel or Okawa. In view of the cancellation of claim 1 and amendments submitted above, this rejection is now moot.

4. Claim 8 was rejected under §103(a) over Arai in view of Kolm, Riedel or Okawa.

To the extent that this rejection might be applied against the amended claims, it is respectfully traversed.

As explained above, claim 8 has been rewritten to include the subject matter of cancelled claim 1. With reference to Fig. 47 of the present application, claim 8 recites, among other things, that holes 290, or alternatively recesses, are formed in at least a portion of thin plate section 16a where P/E element 24 is formed. Claim 8 has been further amended to clarify that the holes or recesses are formed in the thin plates. Forming holes 290, or recesses, in at least a portion of the thin plate sections substantially increases the area in which P/E element 24 is glued to a portion of the thin plate (specification, page 97, lines 15-23). Thus, the present invention makes it advantageously possible to use a thinner adhesive layer 202 to affix the P/E elements to the thin plates. No such structure is disclosed in the prior art references, discussed below.

Arai discloses a parallel plate type oscillatory gyroscope. With reference to Fig. 3 of Arai, oscillatory gyroscope 31 includes an elastic metal body 30 having first and second parallel plate portions 32 and 33, respectively, formed by perpendicular throughholes 34 and 35, respectively. The parallel plate portions have PZT thin film 36 and flat plate electrode 37 formed thereon. As is clearly shown in the drawings in Arai, there are no holes or recesses formed in any portion of Arai's first and second parallel plate portions.

Nor does any of the applied art of record disclose a thin plate section which has holes or recesses formed in a portion thereof. Fig. 1 of Kolm illustrates a P/E actuator 12 which includes brass metal plates 26 and 27 as the outer layers of the actuator. Fig. 1 of Riedel shows that first and second stacks 3 and 4, respectively, are each positioned on a supporting body 9. Fig. 4 of Okawa shows a layered-type P/E element positioned on a thin-film vibration plate 35. None of Kolm, Riedel or Okawa discloses the use of thin plate sections having holes

or recesses formed in a portion thereof. Therefore, even if the multi-layered actuator films shown in Kolm, Riedel or Okawa were to be incorporated into Arai's parallel plate type oscillatory gyroscope, the resultant structure would still fail to disclose or suggest the "holes or recesses formed in the thin plates" limitation recited in claim 8.

In view of the foregoing, reconsideration and withdrawal of the §103(a) rejection of claim 8 are respectfully requested.

5. Claims 10-13 were rejected under §103(a) over Bruneé or Arai in view of Okawa, Riedel or Kolm. To the extent that this rejection might be applied against the amended claims, it is respectfully traversed.

With reference to Fig. 28 of the present application, claim 10 recites, among other things, that end surface electrodes 28c and 30c electrically connect an electrode film that contacts one of the P/E layers and an electrode film that contacts another one of the P/E layers. For example, Fig. 28 shows that end surface electrode 28c electrically connects electrode film 28 which contacts one of the P/E layers 26 and an electrode film 28a which contacts another one of the P/E layers 26. In addition, claim 10 recites that the end surface electrodes 28c and 30c are electrically connected to terminals 28b and 30b, respectively, which are provided on a surface of an outermost layer of the P/E layers and which are separated from one another by a predetermined distance. There is no disclosure in the prior art, discussed below, of the "end surface electrodes electrically connecting electrode films and terminals on an outer layer of the P/E layers" limitation recited in claim 10.

Fig. 1 of Riedel shows that first and second stacks 3 and 4, respectively, each include a plurality of ceramic layers 6 positioned between electrodes 7. With reference to Fig. 2 of Riedel, the electrodes within the stacks are connected alternately via a respective outer electrode to positive and negative poles 23 and 24, respectively. The electrodes are also

connected via supporting body 9 to a switchable terminal 18 (column 6, lines 32-38 of Riedel). Although Fig. 2 of Riedel apparently shows that first and second edge electrodes 31 and 32, respectively, electrically connect first and second groove electrodes 28 and 30, respectively, Riedel's positive and negative poles are not formed on the same outermost P/E layer, as is recited in claim 10.

With reference to Fig. 4 of Okawa, a layered-type P/E element includes P/E layers 40 positioned between a plurality of positive and negative electrodes 44 and 42, respectively. With reference to Fig. 6 of Okawa, negative and positive electrode terminals 43 and 45, respectively, are positioned on different ceramic layers, and are not provided on a surface of an outer most layer of the P/E layers, as recited in claim 10.

Fig. 1 of Kolm shows that P/E actuator 12 includes P/E layers A-F positioned between electrodes 36, 38, 40, 42, 44, 45 and 47. As explained above, the outer layers of Kolm's actuator are formed with brass metal plates 26 and 37. There is no disclosure in Kolm of the positive and negative electrode terminals being positioned on an outermost P/E layer of P/E actuator 12.

In light of the above discussion, even if Okawa, Riedel or Kolm were to be combined with Arai or Bruneé as asserted by the PTO, there would still be no disclosure of end surface electrodes connecting electrode films and terminals on an outer layer of the P/E layers, as recited in claim 10.

In view of the foregoing, reconsideration and withdrawal of the §103(a) rejection of claims 10-13 are respectfully requested.

6. Claim 6 was rejected under §103(a) over Kolm, Riedel or Okawa. Applicants respectfully submit that the arguments submitted above distinguish claim 8 from Kolm, Riedel

or Okawa. Since claim 6 depends directly from claim 8, claim 6 is also believed to be allowable over Kolm, Riedel and Okawa.

The PTO is requested to confirm receipt and consideration of the Information

Disclosure Statements filed on:

**November 27, 2001,
January 24, 2002, and
March 14, 2002.**

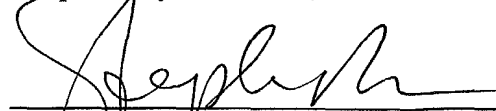
The PTO is requested to acknowledge Applicants' §119 claim for priority from the corresponding foreign applications listed on the New Application Transmittal form with the original application papers filed.

For all of the foregoing reasons, Applicants respectfully submit that all pending claims herein are in condition for allowance. Accordingly, the Examiner is requested to issue a Notice of Allowance for this application in due course.

If the Examiner believes that contact with Applicants' attorney would be advantageous toward the disposition of this case, the Examiner is herein requested to call Applicants' attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,



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July 24, 2002

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3. (Amended) The piezoelectric/electrostrictive device according to claim ~~18~~, wherein said multilayered member is composed of ten or less of said actuator films.

4. (Amended) The piezoelectric/electrostrictive device according to claim ~~18~~, wherein each of said actuator films is formed by means of a thick film printing method.

6. (Amended) The piezoelectric/electrostrictive device according to claim ~~18~~, wherein said adhesive has a thickness of not more than 15 μm .

7. (Amended) The piezoelectric/electrostrictive device according to claim ~~18~~, ~~wherein further comprising an underlying layer is formed on a surface of said~~ piezoelectric/electrostrictive element opposed to a respective one of said thin plate sections.

8. (Amended) ~~The~~ A piezoelectric/electrostrictive device ~~according to claim 1,~~ wherein comprising:

at least one actuator section including a piezoelectric/electrostrictive element secured onto thin plate sections made of metal with an adhesive intervening therebetween, said at least one actuator section comprising a multilayered member including at least three or more actuator films each comprising a piezoelectric/electrostrictive layer and electrode films, wherein
one or more holes or recesses are formed in at least at a portion of said thin plate sections at on which said piezoelectric/electrostrictive element is formed.

9. (Amended) The piezoelectric/electrostrictive device according to claim 18, wherein at least a portion of a surface of each of said thin plate sections, on which said piezoelectric/electrostrictive element is formed, is a rough surface.

10. (Amended) A piezoelectric/electrostrictive device comprising a pair of mutually opposing thin plate sections made of metal and a fixation section for supporting said thin plate sections, and including an actuator section with a stacked type piezoelectric/electrostrictive element fixed on at least one of said thin plate sections by the aid of an adhesive, ~~wherein said~~
~~——— a stacked type piezoelectric/electrostrictive element is composed of~~
comprising a plurality of piezoelectric/electrostrictive layers and electrode films; and,
wherein
~~——— said electrode films, which contact with upper and lower surfaces of said~~
~~respective piezoelectric/electrostrictive layers, are and alternately led extend to~~
~~opposite end surfaces thereof, and end surface electrodes, which electrically connect~~
~~said respective an electrode films that contacts one of said piezoelectric/electrostrictive~~
~~layers and an electrode film that contacts another one of said~~
piezoelectric/electrostrictive layers, said end surface electrodes being alternately led
~~to said opposite end surfaces, are electrically connected to terminals which are~~
~~provided on a surface of an outermost layer of said piezoelectric/electrostrictive layers~~
~~and which are arranged while being separated from each other one another by a~~
predetermined distance respectively.

14. (Amended) A piezoelectric/electrostrictive device comprising:
a pair of mutually opposing thin plate sections, and a fixation section for

VERSION WITH MARKINGS TO SHOW CHANGES MADE
Amended claims